THE NAVAL SAFETY CENTER'S AVIATION MAGAZINE

approach

December 1999

Looking Backward, Looking Forward

How'd They Do That?

I Nearly Found Out!

I Can Fly Instruments!

inside approach

The Naval Safety Center's Aviation Magazine
December, 1999 Volume 44, No. 12
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Norfolk, VA 23511-4399

Approach (ISSN 1094-0405) is published monthly by the Commander, Naval Safety Center, 375 A Street, Norfolk, VA 23511-4399. *Approach* contents should not be considered directive and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. Views expressed in guest-written articles are not necessarily those of the Naval Safety Center. *Approach* is available for sale by the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Subscription price: $31 per year. Telephone credit card orders can be made 8 a.m. to 4 p.m. Eastern time at (202) 512-1800. Periodicals postage paid at Norfolk, VA and additional mailing offices.

pg.12

features

departments

Cover captions:

Main photo: USS *Langley* (CV-1) with its small flight deck covered with aircraft, c. 1927.

1. Barging a Sopwith 1½-Strutter—a WWI British design that flew with the U.S. Navy in the early 1920s—to the USS *Oklahoma* (BB-37).
2. Ancestors of present-day P-3 ASW ops, these flying boats are Consolidated P2Y-1s of VP-10, 1935. P2Ys from this squadron made a record-breaking flight from San Francisco to Hawaii in January 1934. Flight time was 24 hours and 43 minutes.
3. An F7U-3 Cutlass launches from USS *Hancock* in 1956. One of the more drastic designs to see squadron service aboard carriers, the Cutlass saw only a few years of disappointing operations.
4. 1stLt. Alfred Cunningham, marine aviator No. 1, stands by a Jenny trainer in 1914.
5. Craning an observation floatplane—perhaps a Vought—aboard USS *New York* (BB-34), c. 1928.
6. VF-10 ace Ltjg. Don Gordon leaves his Hellcat aboard USS *Enterprise*, 1944.
7. An odd configuration, the Burgess-Dunne AH-7 was a license-built aircraft originally built by the British-based Dunne factory. It used a 30-degree wing sweep. Scene is Pensacola, 1917.
8. An F9F-2 Panther returns to its carrier off Korea in 1951. The first successful carrier jet fighter, the F9F saw considerable action during the 3-year conflict.
9. A lineup of naval aviators at RNAS Killinghome on the North Sea coast in July 1918. The station was a busy anti-sub base. The photo shows the early aviation-green uniform of the period.
10. A Douglas F4D Skyray from VF-102 leaves USS *Forrestal*, 1961. The F4D was the only delta-wing design to enter service aboard U.S. carriers, along with the tail-winged Cutlass.

Looking Backward, Looking Forward:

A Short Survey of Naval Aviation As We Enter the New Millennium

by Peter Mersky

If you're like us, you're sick of the new millenium already, so we aren't doing a—quote—millenium issue—unquote. But, we would be remiss if we didn't offer a piece about where we've been in the last century.

Naval aviation has been with us for more than just a hundred years. It began with experiments with aviation-capable ships in the 1800s using manned balloons. The first years of the 20th century saw tentative, eminently unsuccessful, steps using boat-launched air vehicles, especially by S.P. Langley.

By 1910, naval aviation involved mainly seaplanes and flying boats, which took off and landed on the long, unobstructed, "runway" offered by water. Air races were often held on waterways, and many of the world's first military air arms employed waterborne airplanes.

Britain, France, Russia, Italy and Germany were the major air powers. In spite of Ohio's Wright Brothers, we in America did little to retain our initial standing as a premier aviation center.

Washington watched developments with interest, however, and by 1911 had established an office of aeronautics with Capt. W.I. Chambers as its director. During this early period, civilian Eugene Ely astounded observers by launching (in 1910), and recovering (in 1911) from anchored cruisers. His "flight gear" consisted of a football helmet and various accoutrements, e.g., jackets, inner-tubes. The deck gear involved sandbags and wires.

In September 1911, Ely had described his requirements for flight gear, hoping the Navy would reimburse him. He needed a light helmet, with detachable goggles or a visor, with covering for his ears, a leather coat and trousers, high, rubber galoshes and gauntlets...and a life preserver.

Major developments occurred in Europe, and by the mid-war period of 1916, Britain's Royal Navy had

Flying a Chance Vought UO-1, LCdr. Marc Mitscher makes the first recovery aboard the new carrier *Saratoga in 1927*. Note the fore-aft wires, which a "comb" on the aircraft's main landing gear snagged. "Fiddle bridges" held the wires off the flight deck. This arrangement was soon abandoned for the now-familiar cross-deck cables.

Sailors and their chief check out the main wheels of a Grumman SF-1, which featured retractable landing gear, a real novelty in the mid-1930s.

Eugene Ely on the “flight deck” of the USS *Pennsylvania* on January 18, 1911, after “trapping” for the first time. Note his protective headgear and cross-chest life preserver made of inner tubes.

A group of students from the First Yale Unit—the beginnings of the Naval Air Reserve—haul a Curtiss R floatplane up the ramp at Huntington Beach, Long Island, in 1916.

The pilot of a Boeing F4B is about to make a midair arrestment on USS *Langley* in the 1930s. By now, cross-deck pendants and tailhooks was the accepted arrangement.

fielded a large, aviation-capable cruiser to launch and retrieve aircraft which were fairly successful in combat. Other forms of sea-based aviation involved towing a small barge behind the ship, with a fighter on the barge. The pilot launched to attack whatever aerial threat developed, and then ditched beside the mother ship. It was a one-shot defense, but it had its appeal—assuming the aircraft were cheap and plentiful. This operation would reappear in 1941 when RAF Hurricane fighters launched from merchantmen to intercept prowling German bombers. After their one-way mission, the British pilots ditched alongside their ships.

With the end of the war, Britain had the lead in naval aviation, with five carriers in service, and several under construction.

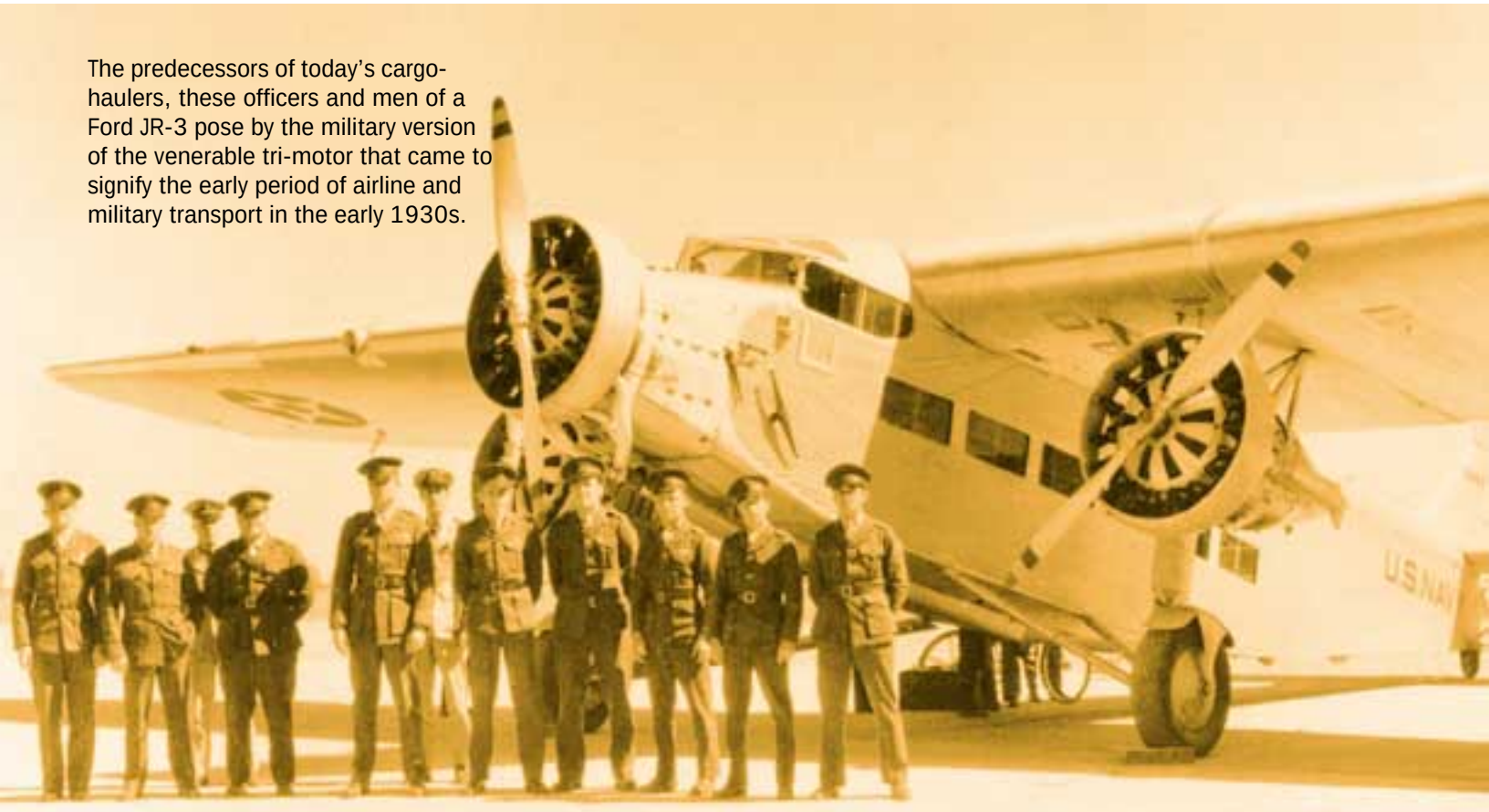
Having now realized its role in international affairs, the U.S. also began developing seaborne aviation. Actually, U.S. naval aviation had been a viable force in the recent war. Hundreds of crewmen in various aircraft had flown from naval air stations on the French and Belgian coasts, mainly against German submarines, but also against land-based targets and other threats. The first Medal of Honor given to a naval aviator went to a young ensign in the Adriatic theater. Charles Hammann landed his small Italian Macchi flying-boat fighter in choppy seas, under enemy fire, to retrieve a squadronmate, who had ditched.

By 1916, the Navy had established its primary flight-training base at Pensacola, with its lengthy beaches along a wide bay that accommodated various beaching sites for the variety of flying boats and floatplanes that served as trainers. Originally, flight training had been conducted first at a camp at Annapolis, then San Diego, at a site donated by pioneer aviator Glenn Curtiss, from whom, coincidentally, the Navy had purchased its first aircraft.

"The United States Naval Aeronautic Station" issued a lengthy list of rules and procedures for its neophyte aviators, covering a flight from inspection to shutdown.

The list advised pilots to "Note the direction of wind and character of gusts," and to "See that radiator is filled, that the oil level is correct..."

Also, "See that no loose tools or other articles have been left in or on any part of the aeroplane."



The predecessors of today's cargo-haulers, these officers and men of a Ford JR-3 pose by the military version of the venerable tri-motor that came to signify the early period of airline and military transport in the early 1930s.

A wartime view of two greenshirts servicing the main gear of a Douglas SBD dive bomber, 1944.

The rear gunner of an SBD mans his twin .30s. Note the belt-mounted ammunition and the single kill flag on the side.

Marine crews pulled this Wildcat out of its hangar after the fighter was set afire by a Japanese bomb on Guadalcanal, Sept. 1942.

Pappy Boyington's Black Sheep scramble in the Solomons, 1943. Their early F4U-1 Corsairs feature "birdcage" canopies.

"Do not start from runway until chief mechanician has signaled, 'All clear.'"

Once in the air, the pilot had many rules and other sorts of guidance to back him up.

"If motor develops any unusual sound while in the air, throttle down and come into a glide...when motor misses or dies, come into a glide instantly." And, of course, the vital admonishment, "...in the event of fire, turn off pet cocks in gasoline line as soon as possible and open cock on extinguisher line—and land."

During this early period, the term "Navy Air Pilot" was replaced by the now-familiar "Naval Aviator." The former term still referred to enlisted aviators, while the latter moniker denoted officers. Yes, there was a time when enlisted members were at the controls. This unique group of "NAPs" served through the 1970s, although in vastly reduced numbers, and many saw a great deal of combat, especially in the first half of World War II. One of the Navy's first aces was Machinist Mate Donald E. Runyon of VF-6 flying F4F Wildcats from USS *Enterprise* (CV-6). He was commissioned in 1943 and gained 11 kills.

In July 1915, acting on recommendations from Pensacola, the Director of Naval Aeronautics in Washington established 13 required instruments and devices to be included in every service aircraft: airspeed meter, incidence indicator, tachometer, skidding and slideslip indicator (the old needle-and-ball), altitude barometer, oil gauge, fuel gauge, compass, course-and-distance indicator, magazine camera, binoculars, clock and sextant. By January 1916, authorization for

Continued on page 28

Naval aviation is both art and science. Art, because you have room for innovation and creativity; science because certain constants apply. One widely known constant: Every carrier aviator has his or her night in the barrel. Another constant: All naval aviators make mistakes, regardless of seniority or experience.

Our pride makes us reluctant to admit there are chinks in our personal armor, or that we have weaknesses. However, we can often prevent mishaps by introspectively evaluating our personal contributions to a near-mishap, and by sharing the results of that self-evaluation with others. This is especially important in the single-seat community, where errors can go unnoticed by all but one person—you.

A former FA-18 CO congratulated me on picking up command and promptly warned me that he came closer to killing himself during his command tour than at any other time in his flying career. After 12 months as an XO, I agree with him. At least I now realize when I have a close call.

Lots of factors combine to put senior aviators at risk: three tours of non-flying shore duty prior to command, a heavy personal and operational workload, the weight of increased responsibility, and perhaps a false assumption that you must be right. After all, you're the experienced guy with 2,000 hours in type.

During 70 days of combat over Kosovo and 60 days of peacekeeping interspersed with combat missions over Iraq, you'd think the closest calls came over enemy territory. I found there are plenty of opportunities to damage or lose an aircraft on the friendly side of the border, too. Here's how I came to that conclusion.

Proof of constant No. 1: dark rainy night, no horizon, coordinated strike into Kosovo, four S-3 tankers stacked at 1,000-foot

intervals with three or four strikers on each tanker. The minimum-comm tanking plan was thoroughly briefed before flight, a routine pre-strike administrative procedure. My thoughts as I watched the brief were of rendezvous basics of survival: be on altitude, on bearing line, and keep a sharp lookout.

I removed my NVGs because of IMC and locked onto my assigned altitude as I entered the briefed tanker circle. The circle had been moved to avoid a rain squall, so it took some groping to find a faint, green light level with my HUD zero-pitch line. Finally, after several passes at various aspects with other strike aircraft searching for their tankers, I managed to get on bearing line a mile from my tanker.

At one-half mile, I noted another package passing close beneath my nose as I began to make out the form of my S-3. Hmm, better have a look around. A few scans outside, and I felt confident I was alone on the rendezvous bearing. So far, routine naval aviation.

A few hundred feet from the S-3, I reached for the probe switch. Suddenly the tanker was bathed in white light, but not from my probe light! At that moment, I discerned a faint jet roar and saw an F-14 a few feet above and behind my Hornet! So much for routine. My new wingman and I flew escape maneuvers, tanked and completed our missions. No harm, no foul.

After the mission, we met in CVIC to discuss the near midair. We determined we must have flown slightly different rendezvous bearing lines and altitudes for several minutes, a scary thought. My Hornet was hidden beneath his Tomcat's nose, and I never checked my dead-six between the tails for traffic.

I distinctly remember my personal post-incident analysis revealing nothing wrong with my rendezvous program, so I naturally assume the other guy must have gooned it by being high and sucked. After all, he was a nugget and I was the old salt.

Proof of constant No. 2: beautiful day, Arabian Gulf, KC-10 tanker at 20,000 feet and a whole host of well-briefed strikers inbound for comm-out tanking. I fly to a position about two miles at my tanker's left 7 o'clock. I see an F-14 several thousand feet below me and reason that he is going to the S-3 tanker below. I expedite getting on the rendezvous bearing, on altitude, at about 1 mile. After scanning outside, including between the tails of my Hornet, for traffic, I again feel confident I am alone on the bearing. A few hundred feet away I put my probe out, and my radar altimeter warning goes off, indicating 350 feet.

My first thought is that it is malfunctioning, but as the warning tone persists, the hair begins to stand up on my neck. Suddenly, the warning "whoop" stops, and an F-14 appears close aboard to my left from beneath my aircraft.

This time, the post-incident analysis reveals I was 100 feet high during the rendezvous and approximately on bearing for several minutes. My unseen wingman, also a squadron XO, joined directly below my Hornet on nearly the same bearing, several hundred feet below the tanker altitude. The roles were reversed, but the result was the same, a near midair during routine operations.

How did this happen to me twice in the same deployment? Could all the other pilots in the air wing really be that gooned up?

The answer is no. I had to look in the mirror. I had to be doing something wrong for this to happen twice. In all midair collisions or near misses, each pilot has opportunities to break the chain of events. It's like checking for traffic before crossing the street. Drivers should see and avoid you and drive the speed limit in the center of their lane, but if you get run over in a crosswalk, you're still dead. A check over the leading edge extension to clear the area beneath my aircraft and a scan directly between my tails to clear the area behind my aircraft is now part of my rendezvous game plan.

It took two incidents to convince me I was probably part of the problem and definitely part of the solution. In my quest to survive this tour unscathed, I'm going to focus on managing risk inside my cockpit first. How about you—feeling confident after your 500, 1,000 or 1,500 hours in type?

Cdr. Smith is the XO of VFA-15.

It's hard to describe how it feels to know, at 40 feet, you are going to hit the ground.

It Would Have Been Nice To Have Known About This Guy

by Lt. Dan Drake

I was flying with a new ATO who had only been in the squadron for a month. It was his last flight before his H2P check with the skipper. We went down to Imperial Beach to do some rocks-and-blocks to start the flight. Basic stuff, essentially show and tell, and he knew the procedures well enough to check the block.

After an hour of the vertrep and a little pattern work to warm up, we had burned down to about 2,800 pounds. We decided to go to the local mountain pads for a fam. On the way there, I noticed that Brown Field (a civilian airfield that lets us work a taxiway in a left-hand pattern) was empty.

Knowing the skipper was probably going to take this guy to an unfamiliar field on his H2P check, I offered him the chance of going to Brown Field for some work after the mountain pads. He agreed, admitting that he had not been there before. No big deal, I thought. Brown Field is usually fun to work simply because there aren't any other military aircraft around, and my copilot wasn't the type who performed well in front of a crowd. Let's just finish the prologue with this: He wasn't very outspoken in the cockpit, which is typical for copilots coming from the FRS, who are still in the training-command mentality.

I also had some gouge from other HACs that his air work was average at best. Autorotations had never come up in those conversations. I sure wish they had.

I took us into Brown and entered the left pattern to taxiway Delta. I did the first couple of turns in the pattern just to get him used to the sight picture, then let him do a couple of turns himself. We were now down to about 2,300 pounds, the wind was decent, and the aircraft was flying well. Time to try some autos. I shot the first auto just to see how the aircraft was going to feel. It felt fine, so I didn't anticipate problems—with the aircraft, that is.

The next conversation should have been the red flag. I handed him the controls and asked if he was going to impress me with his autos. He told me in so many words that he had problems with autos. No big deal, I thought. I would just watch him shoot a couple and see where the problems were. We definitely had plenty of time to work on them.

He shot the first auto straight-in, 80 knots. He actually was set up nicely between 800 feet and 200 feet. Here's where the problems started. I called, "Two hundred feet, flare," and didn't get much in the way of a flare. I called, "One hundred feet, airspeed's coming off," and didn't get any more flare. I called, "Sixty feet, recover," and we recovered at 50 knots and 50 feet—more like a low approach than the bottom of an auto.

I told him he needed to flare more to get the airspeed off—step one, at least. Also, the bottom of the auto felt...different. Just a feeling for now, but something I really couldn't put my finger on. Getting light in the straps wasn't part of any auto I had ever shot before, but it happened at the bottom of this one, and I wasn't sure why.

I shot the next two autos, talking out loud at every step along the way, just so he would know what I was thinking while I was doing it. I returned control to him. Same song again; too high with too much airspeed at the bottom with a weird feeling in my gut when we got to the "rock and pull." I then asked him if my nose attitude at the bottom of my autos made him uncomfortable. He said yes. Good, now we're getting somewhere. I explained that you need the high nose attitude to get the airspeed off and beyond that, it's just the way you shoot autos in the H-60. End of discussion. You need to get comfortable with it and move on. As far as the weird feeling at the bottom, I figured that the "pull" was coming about a half beat too late, so we were dropping at a pretty much level attitude with the engines decoupled from the rotor system. I explained that as well, saying the "rock and pull" have to come connected to each other. None of this hanging in the straps below 100 feet.

The tough part of this experience was hearing from another HAC that the same guy had scared the hell out of him with his autos about a week before.

The next auto scared me more than anything ever had in the cockpit. My first deployment, I had the fearless nugget mentality, and probably should have been scared, quite a few times. Now I knew enough to be scared and I was. At 200 feet, the flare was OK, but not quite enough. I called, "One hundred feet, airspeed's coming off," and at 80 feet, the flare started. Then, as far as I could tell, the nose attitude spooked him, and he immediately rocked the cyclic forward. Now we were going through 60 feet with forward airspeed, dropping like a rock. I called, "Power, power," and then said, "I have the controls."

It's hard to describe how it feels to know you are going to hit the ground at 40 feet. The bad part was that my copilot froze on the controls. The aircraft hit the ground with the right main mount first and right sideward drift.

As I was pulling a full arm of collective and thinking, "I don't want to roll this aircraft, I don't want to roll this aircraft," we bounced off the deck, the engines caught up, and we swapped ends at about 10 feet. After all the motion ceased, I finally got a "Roger, you have the controls," and he stopped "helping" me fly.

Tower asked if everything was OK. I requested permission to set it down to take a look. I'm sure tower thought he had a good seat for the whole thing, but he was in the bleachers, compared to my luxury box. My AW got out first and did a walk-around while I tried to think of something to say.

"Do you know what just happened?" were the first words out of my mouth, and the answer I got was, "Yeah, we just lost tail-rotor control."

"No, that's what happens when you've got an armpit full of collective and no airspeed." I didn't feel like talking about it right then. My AW came back and told me everything looked OK. I got out and did a walk-around. Didn't hit the stab or the radome, and the right mainmount didn't even compress all the way. It was about an inch away from full stoke, and, for that matter, the ELT wasn't going off (which would have meant we hit with more than 5 G's). So I guess it looked and felt much worse than it really was. Regardless, we knocked it off, flew home, and I began a hard-landing inspection and immediately told the skipper and XO what had happened. The aircraft was fine, and my copilot ended up passing his H2P check after doing some autos with the training officer.

The tough part of this experience was hearing from another HAC that the same guy had scared the hell out of him with his autos about a week before. Would have been some nice information to have before we went out. This information should have been discussed at a human-factors council or a squadron stan-board. Had I known about this pilot's trends and tendencies, I wouldn't have been surprised at his technique and wouldn't have had to do so much figuring out on my own. I definitely wouldn't have let that last auto go as far as it did before taking the controls.

Lt. Drake flies with HSL-47's Det 5.

How'd They Do That? I Nearly Found Out.

by Lt. Jeff Nowak

The packout was underway, along with a million other things that accompany shore-to-ship operations. In the middle of all the activity, the LSOs were bouncing the squadron for the at-sea period, closely observing the pilots for trends. Although FCLPs aren't normally considered exciting, we endure the seemingly endless trips around the pattern, knowing that three-quarters of a mile surrounded by blue water on a dark night can be quite a thrill. On this night, even VFR GCAs to a long runway managed to get our hearts pounding.

My crew had only been together for a few flights but things were coming together nicely. We were flying radar approaches in typical northwest-winter weather, hitting scattered to broken layers from 800 to 5,000 feet, with gusty winds. Our SOP didn't require a backseater since the field was technically VMC, but our XO decided to tag along in the trunk for some flight time. Both my pilot and XO were prior A-6 aircrew with plenty of traps and hours under their belts. I considered myself to be a fairly salty JO with one cruise and two sets of work-ups to my credit.

The first two approaches were OK, and my pilot did a nice job of flying the needles while penetrating several layers below 3,000 feet. The controllers seemed a little behind this evening, but with the ACLS working and good ball work at the end, we didn't let it bother us.

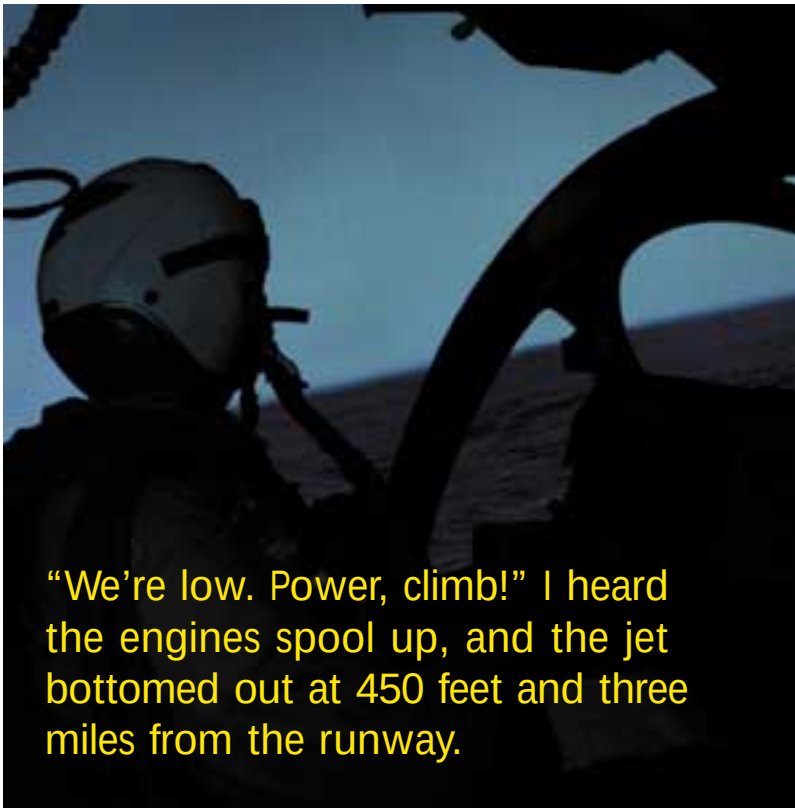
Our third pass was the one that still makes me shake my head. Approach gave us an early hook, which was fine with us since we already had our gear down.

"Turn right, one six zero, and take angels one point eight," the controller said.

In the turn, we were told to continue our turn to 240 and standby for lock-on.

"Five Oh Two, lock-on at four and a half miles, call your needles." They concurred with our "on-and-down" call and told us to continue our Mode II.

My pilot was making the necessary corrections down to glide slope when I noticed that the horizontal needle hadn't moved since we started our descent. I glanced at the VSI, saw 1,400 fpm down and looked at our altitude. It was 800 feet! My slow-moving mind knew this wasn't right, especially with the DME reading more than three miles.



"We're low. Power, climb!" I heard the engines spool up, and the jet bottomed out at 450 feet and three miles from the runway.

Just as I started to call, "We're low. Power, climb!" I heard the engines spool up, and the jet bottomed out at 450 feet and three miles from the runway. Approach hadn't given any advisory calls as we flew toward the water.

We quickly climbed to glide slope and requested a Mode III PAR after advising the controllers the ACLS didn't work. The needles were intermittent the rest of the night, but our near disaster had definitely "fixed" our scans. How was it that all three members of an experienced crew failed to do the most basic crosschecks? The FCLP and GCA patterns were becoming old hat. A smooth start to our night had lulled us into a false sense of security.

We've all heard the same reminders to stay vigilant and never let our guard down. I still can't believe we almost hit the water in controlled flight, causing one of those mishaps that leave other aircrew asking, "How could they just fly into the water like that?"

Lt. Nowak flies with VAQ-129.

I Can Fly INSTRUMENTS!

by Lt. Phil Kase

Every pilot who goes through flight training at South Whiting Field knows you work very hard to get your instrument ticket punched. We all remember the failed-card TACAN and NDB approaches, the ILS and localizer approaches, and of course, the ASR and GCAs. After about 20 BI-RI flights in primary and intermediate, and about 20 BI-RI flights in advanced, you feel like an instrument flying machine. You are the best instrument pilot you've ever been and fear no IMC.

I was up for the RI-17 flight, which was a pre-check for the instrument check ride and actually a much more difficult flight. Like every afternoon in Pensacola, the weather was cloudy. Today, the clouds stuck around and promised actual instrument time.

We briefed, got the weather, and headed out to the aircraft to preflight and man up. Winds were forecast out of the southeast between 15-20 knots, gusts to 30. The ceiling was 500 overcast, and solid up to 6,000 feet. The visibility was unrestricted below the ceiling. I didn't have to wear that stupid visor. Finally, actual IMC.

The plan was to do the obligatory failed-card approaches, but we decided not to. We went into the goo at 500 feet, and it was solid. We shot an NDB and a TACAN approach, with actual missed approaches.

Next, holding over the Crestview VORTAC, we were stacked four high waiting for clearance to descend and shoot a localizer approach. Our turns in holding were extended. The corrections to the holding pattern weren't working, because of the high winds, and to top it off, the instructor admitted he was getting serious vertigo. No sweat, I was a great instrument pilot. I could handle it.

The crewman in back was very quiet, never a good sign. After dropping down in holding a few times, we were finally cleared for the localizer approach. After shooting it and making an actual missed approach, we decided to dial up South Whiting ATIS, which reported 300 feet overcast. We had 30 knots of wind in the face returning, and we used most of our reserve fuel while holding. We started toward home.

The radios were strangely quiet. We were so busy aviating and navigating, no one was communicating. We called ATC for a radio check. They were working, a good thing, but that meant no one else was flying, a bad thing. We checked ATIS again—ceiling 200 feet, overcast. Good thing we were heading home. What was that caution light? Oh, the flickering mission-complete light. It read "fuel low." We called for the GCA. Normally, there is background chatter; now there was none.

We continued, and I shot the approach. The tailwind required us to descend at 1,200-1,500 fpm. It felt like an instrument autoration. The barometric altimeter was spinning like a top going through 500 feet.

We were cleared for landing. Although I knew there were tall trees out there, I just couldn't see them. I figured we'd be a smok-

Photo-composite by Allan Amen

ing hole in about 20 seconds. I hoped we'd break out soon. The altimeter kept going down fast. I looked inside, the instructor was outside. Decision height, no lights, no field, just white clouds. We made the missed approach and turned downwind.

We thought about our alternate, Pensacola Regional. We checked their ATIS. They reported the same weather. We had to decide whether to fly into a headwind to the alternate and the same minimums, having one shot at an approach, because of fuel restraints, or stay in the pattern and have fuel for a couple more approaches. We chose the latter.

By this time, the mission-complete lights were steady and seemed a lot brighter. The instructor said he had recaged his head and the vertigo was gone. He wanted to shoot another GCA. We requested a little-known pattern called the "very abbreviated" pattern to get on final again. We rolled on final. He was inside, I was outside. He shot the approach (auto). I was in and out. I knew he was shaking off vertigo, and I backed him up.

We reached decision height again, and a moment later we picked up the lineup lines and broke into unrestricted visibility, below the ceiling. I started breathing again. On deck, the debrief was educational for both of us.

You can be the world's best instrument pilot, but if the weather is below minimums and you have to land, it doesn't matter, period. We could have done things better. Just because you can fly instruments doesn't mean you can land in IMC. Keep the big picture.

By the way, my instrument check ride was cake.

Lt. Kase flies with HSL-49.

Bad Idea: Get Vertigo Good Idea: Turn Off Your HUD

by Lt. Mike Healy

You've heard Hornet pilots say they'd rather land on an aircraft carrier single-engine than without their heads-up display (HUD). I had two opportunities to validate this bold statement during my first fleet tour.

For those not familiar with the Hornet, the HUD is our primary attitude instrument. Whether dog fighting, dropping bombs, or flying through the "goo" on an approach to a pitching carrier deck at night, we rarely have to avert our scan below the glare shield. Crucial flight information, including the coveted velocity vector (INS-generated flight-path indicator), projected into the pilot's field of view significantly reduces workload during all phases of flight. When this valuable instrument doesn't work, the pilot's workload increases at a rate directly proportional to the increase of his heart rate.

I was a new guy in the squadron and had managed to attract some attention for typical buffoonery. A department head and I were scheduled for a 2 v 2 intercept hop on a particularly dark night in the Puerto Rico op area. I had the added bonus of going to the KC-135 tanker for the first time, and my excitement and apprehension were exacerbated by my first real taste of vertigo. On the way to our CAP after my jousting session, I cursed the tanker pilots for having the audacity to do acrobatic maneuvers during my attempts to get into the "Iron Maiden."

Suddenly, I noticed my airspeed increasing and my altitude rapidly decreasing. It appeared that my lead was doing a barrel roll around my aircraft. My vertigo returned as I stared at straight-and-level indications in the HUD. I chose standby on the attitude-selector switch, which filters out the INS attitude input and uses the standby attitude-reference indicator as the primary source of attitude information. I was surprised to discover that I was in a 45-degree diving spiral. I immediately recovered from the unusual attitude and explained what happened to my lead. We knocked off the mission and proceeded back to the ship.

It appeared that I had experienced an insidious INS failure with no associated cautions. Since my attempts at realigning the

Continued on page 19


UNITED STATES
NAVAL SAFETY CENTER
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Milestones

Command	Class A Mishap-Free Date	Flight Hours	Years
VFA-147	07/12/99	34,000	8
VFA-146	07/15/99	58,000	14
VAQ-130	07/25/99	31,800	18
VAW-126	08/01/99	14,000	7
VAW-115	08/17/99	31,200	14
VF-211	09/02/99	49,000	13
PACMISRANFAC BARKING SANDS	09/21/99	54,713	28
VAQ-137	10/01/99	5,000	3
VAQ-140	10/01/99	24,000	14
HS-11	10/09/99	25,800	8
VP-26	10/12/99	271,000	37
VP-8	10/12/99	130,000	21
VT-7	10/12/99	127,000	7
VQ-1	10/12/99	72,000	12
VAW-125	10/12/99	61,000	31

Class A Mishaps

The following Navy and Marine Corps Class A flight and flight-related mishaps occurred since September16.

Aircraft	Date	Command	Fatalities
F-14B	10/21/99	VF-143	0

A Tomcat crashed into the water following a cat shot.

FA-18B	10/28/99	NAVFLTDEMSQD	2

A Hornet crashed while the crew was checking ground-reference points for demo.

UH-60A	11/12/99	NTPS	0

A helo sustained structural damage and lost its tail rotor from a hard landing during flight ops.

S-3B	11/14/99	VS-32	2

A Viking crashed in the Arabian Sea after a left roll off cat 3.

Class A Flight Mishaps Rate

	FY00* thru 11/15/99 No.	Rate	FY99* thru 11/15/98 No.	Rate
Navy/Marine	4	2.35	1	0.53
All Navy	4	3.05	1	0.69
All Marine	0	0.00	0	0.00
NAVAIRLANT	2	5.71	1	2.51
NAVAIRPAC	0	0.00	0	0.00
MARFORLANT	0	0.00	0	0.00
MARFORPAC	0	0.00	0	0.00
CNATRA	1	2.37	0	0.00
NAVAIRRES	0	0.00	0	0.00
4thMAW	0	0.00	0	0.00
NAVAIRSYSCOM	1	23.80	0	0.00
Non-TYCOM	0	0.00	0	0.00

*Data subject to change.

Printed as a supplement to Approach by
Commander, Naval Safety Center
Data: Dr. Michael S. Borowsky
Design: Allan Amen
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POP-UP

Next Generation Radars

Providing Real-Time Bird Alerts

The Air Force's Avian Hazard Advisory System (AHAS) provides near-real-time alerts about bird activity in two-thirds of the lower 48 states. In the past, AHAS used variables such as weather, thermals and time of year to calculate the potential for bird strikes. Now, using next-generation radars (NEXRAD), such as the WSR 88-D, AHAS has proven that it can effectively screen bird activity, and starting January 2000, hourly updates will be posted on its web site (www.ahas.com). These radars identify birds by detecting the water in their bodies. Because birds generally fly at one altitude, the radar can distinguish them from rain, which covers a large vertical area.

AHAS will not replace the Bird Avoidance Model (BAM), which gives historical data, but will supplement and refine BAM data. Within the next two years, AHAS should cover the entire lower 48 states.

AIR Wing

Edited by LCdr. Mark Enderson. Contributors can contact him at (757) 444-3520 Ext. 7245 (DSN 564).
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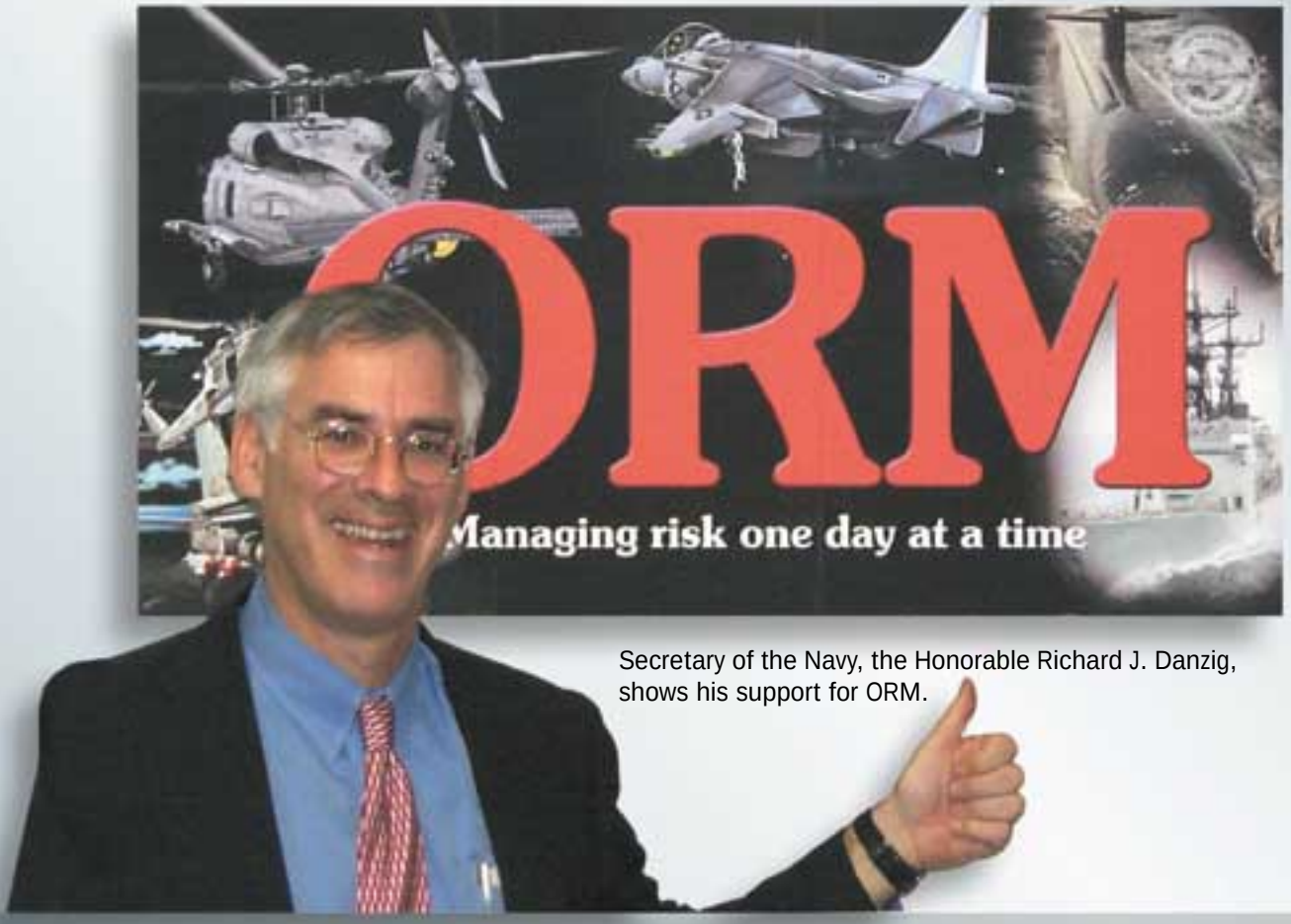
SECNAV visits Naval Safety Center

October 13, 1999, the Secretary of the Navy, the Honorable Richard J. Danzig, visited RAdm. Frank M. Dirren Jr. and his staff at the Naval Safety Center. During his visit SECNAV discussed several safety issues, including aviation, traffic, ship design and future initiatives.

RAdm. Dirren stressed the importance of educating and encouraging all naval personnel to use the ORM process, and incorporate it into every aspect of life, both professional and personal.



Secretary of the Navy, the Honorable Richard J. Danzig, shows his support for ORM.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Managing risk on
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Continued from page 14

INS failed, I would have to fly a standby approach.

Normally, the HUD symbology used for landing (ILS, ACLS, TACAN CDI) is referenced to the velocity vector. In the standby mode, it is referenced to the aircraft waterline symbol. If the aircraft is at the normal approach-configuration airspeed, or "on-speed," there is eight degrees of vertical distance between the velocity vector and the waterline symbol.

During a standby approach, the common tendency is to want to push the nose over to make the sight picture of the symbology look the same as in a normal INS approach. Obviously, this could have catastrophic ramifications. I fell victim to this dangerous tendency during my first approach.

"Don't settle. Power, power!" shouted the LSOs. Struggling to get the ball out of the cellar, I added way too much. "Bolter, bolter, bolter," was the next call I heard.

Next time around I was determined not to get low. I applied the "bracketing" technique and ended up extremely high. Unfortunately, the carrier did not have the 7- or 8-wire rigged, so I sailed off the flight deck, leaving a rooster tail of sparks. As I pondered how much grief I was going to get from my JO buds in the ready room should I ever get aboard, the familiar voice of CAG Paddles interrupted my nightmare.

"Three One One, Paddles."

"Go Ahead."

"Yeah, hey there, knucklehead, why don't you go ahead and turn off your HUD. We'll see if we can get you this time."

"Uhh-h, roger. This must be what it's like to fly a Tomcat," I quipped as I turned final. "Three One One, Hornet, ball, four point oh, no HUD."

"Roger, ball, no HUD."

While not the prettiest pass I had ever flown, I managed to get aboard this time. It was surprisingly less difficult to land with the HUD turned off than trying to use and interpret the degraded symbology.

I decided that during FCLPs I would fly the majority of my landings with the HUD turned off. As a result, my landing performance during the remainder of the workup cycle and my nugget cruise improved significantly.

I continued this technique after cruise during the inter-deployment training cycle. At the beginning of my second cruise, I experienced another unrecoverable INS failure at night. Not wanting a repeat performance from my nugget days, I secured the HUD for the approach. The outcome this time was much better. I got aboard on the first try and didn't need the upgrade for the OK 2. Also, my anxiety level was somewhat reduced because of the hundreds of no-HUD landings I had logged at OLF Whitehouse.

"Don't settle. Power, power!" shouted the LSOs. Struggling to get the ball out of the cellar, I added way too much.

Are you a believer? Remember, the HUD is the primary attitude instrument in the FA-18. Unlike other platforms, Hornet drivers become very reliant on the HUD for landing, especially at the carrier. If you fly Hornets, try turning off the HUD for more than one pass while you're bouncing. You'll become a better ball flyer as a result.

Lt. Healy flies with VFA-15.

Icing Over th

by Lt. Steve Firestone

The return trip from Las Vegas was supposed to be the highlight of a cross-country weekend. We planned on a VFR flight down the Colorado River to MCAS Yuma, where we would refuel, check weather and file IFR back to NAS North Island over the mountains of Southern California. The VFR leg to Yuma was great, as expected. The temperature in Yuma was in the 80s, normal for March.

While the aircraft was being refueled, we went to base ops to check the weather and file our IFR leg back home. Yuma Metro gave us a Dash 1, with a forecast freezing level of 10,000 feet MSL. They also indicated there should be no icing, rain or snow along our route. This was good news because icing was something we definitely wanted to avoid. It was also something the entire crew had discussed several times throughout the weekend because of an SH-60 mishap a year earlier.

We filed for the standard routing from Yuma to San Diego. We planned for an hour and a half flight back home.

After grabbing a quick snack at the Yuma Metro coffee mess, we launched and climbed to 8,000 feet. I called out gauges green and noted our fuel level. I also looked at the OAT gauge and saw it read 11 degrees C. I mentioned this temperature seemed a little high for our altitude. A pilot riding in the back chimed in that 11 degrees C was about 55 degrees F and this higher-than-expected temperature was probably because of our flight over the desert. The copilot and I discussed it for a moment, then agreed the high temperature could be attributed to either a thermal layer or simply the normal conditions found over the desert.

About an hour into the flight, L. A. Center handed us off to SOCAL Approach, who promptly vectored us toward a cloud layer that appeared to go from 7,500 feet up to approximately 9,000 feet. We discussed requesting a climb to stay out of the clouds but figured we could use some actual "in the goo" time.

As we neared the clouds, I ensured the pitot heat was on (as required by NATOPS) and once again checked the OAT gauge. It indicated 11 degrees, so we settled in for some rare actual time. About four minutes after entering the clouds, I noticed the turbine-gas temperature (TGT) was two cubes in the yellow—at its limit of 839 degrees C. I asked the copilot to watch his TGT, figuring he was simply pulling too much power trying to keep up speed at such a high density altitude. There was no ice on my windscreen but there was a small amount of moisture from the clouds. The OAT gauge still indicated 11 degrees.

Just then, the pilot riding in the back asked if I thought the gauge was right because he had ice in his window vent. I noticed what had appeared to be water on the windscreen was actually ice crystals. At this point, my whole body went numb with the realization we had done what we had talked so much about avoiding: We had flown into icing.

I immediately told the copilot to climb and asked SOCAL for 9,000 feet to exit icing conditions. They cleared us, but we could only climb at 100 fpm. The copilot did a good job slowing down and keeping a steady climb in, but now our rotor rpm was beginning to droop and the red low-rotor light was flashing.

I switched on contingency power, but our climb rate was still limited to 200-300 fpm. We were still drooping, and I wasn't sure if we were going to make it to VMC, so I declared an emergency for icing and asked ATC if they could get us to a lower altitude. They came back momentarily with a clearance to 6,500 feet, followed shortly with one to 5,500 feet. I had the VFR sectional out and thought we would clear any obstacles at those altitudes, but by this time, the clouds were beginning to clear, so we elected to continue our climb.

he Desert

When I looked outside at the mirror, I could see at least a quarter-inch of ice had formed.

We broke out at about 8,700 feet at 65 knots, 97 percent Nr, with a 200-300-fpm rate of climb. We continued up to 9,000 feet and told the controller we were clear of icing conditions. When I looked outside at the mirror I could see at least a quarter-inch of ice had formed.

After a collective sigh of relief, we continued to the coast, found VMC, and proceeded back home without incident.

As a crew, we learned more from this 15 minutes of flight time than we probably could get in a six-month deployment. We saw first-hand how good crew coordination can help you through a tight spot. With the assistance of a non-flying pilot, we diagnosed the situation, decided on an action, flew the aircraft, and let ATC know what we needed.

We must remember that a weather forecast is simply a prediction and should not be relied upon too heavily. Even if the weather guessers tell you one thing and your gauges concur, your eyes are the final judge on weather.

Lt. Firestone flies with HSL-45.

The Night I Ne
Crunch Durin

LCdr. Karl Thomas

We had just finished our brief as the night Alert-30 Hawkeye. Nobody really anticipated we would launch, but we would be ready in case a SAR was called away or Saddam decided to act completely out of character and present a viable threat. After operating in the Arabian Gulf for more than 30 days with no port calls and none on the horizon, we were taking things for granted on our evening alert briefs. You could sense it as the briefs began to sound the same. There wasn't much enthusiasm. It wasn't like the days of old when alerts meant you had a chance of launching to intercept Bears or Backfires.

For an E-2C, an Alert-30 doesn't buy you much in a near-land environment. Besides, there was little real threat. For all of you nodding your heads, wrong—there was a real threat (it wasn't long ago when our air wing had put iron on target) but 30 days had made this threat seem over the horizon. To compound the mundane situation, our crew didn't have an aircraft assigned because of various maintenance discrepancies that were being corrected and signed off. It turned out our aircraft wouldn't be ready until 2330, and the day had started long ago at 0600 during flight preparation for the first go.

Knowing the junior guy usually got stuck doing the preflight, I decided to give him a break and volunteered to stay up for the backend preflight. He was very thankful, so I quickly let him know if the alert aircraft changed in the middle of the night he had the new preflight. We both chuckled knowing there wasn't much chance of that happening.

I finally got the phone call from maintenance control that the aircraft was ready. Donning my safety-officer float coat and helmet I headed for the dark flight deck. Much to my dismay, it was actually pouring rain. Now I was really kicking myself for volunteering for this preflight.

I stood in the catwalk for a little while to let my eyes adjust to the darkness. I didn't see my Hummer, so I began working through the maze of aircraft that were jammed together on the bow of the flight deck. Yellowshirts were respotting the deck, but the rain made it hard to see through my visor.

I came across the aircraft on elevator 1, and I took shelter inside. After preflighting the inside, I headed outside for another dousing. I made an effort not to rush the exterior preflight just because of the late hour or the rain. Although my eyes had adjusted, I was focused on the aircraft, not my surroundings.

The "screamer," our radar cooling fan on the outside of the aircraft, was earning its name, and with my double hearing protection I couldn't really tell what else was happening. I was in my own little world, in the middle of the night, focused on my preflight.

After finishing the nosewheel well, I checked the static ports and moved to the nose of the aircraft. The preflight calls for opening the nose cone and looking at the antennas and liquid oxygen container. I undid the two latches and lifted the nose cone up. Suddenly, a whistle

early Caused a ng a Preflight

blast sounded like it was inside my helmet made me nearly jump out of my skin. I quickly leaned back and looked up. I couldn't believe it when I saw the folded wing of an aircraft six inches above the nose cone I had just raised.

While I had been focusing on my aircraft and preflight, the yellowshirts had been moving a C-2 through the tight maze on the flight deck. Fortunately, they had all their wing walkers in place, and somebody was paying more attention than the knucklehead conducting his preflight. Had they not stopped immediately, I would have had the unfortunate distinction of causing a crunch during a preflight.

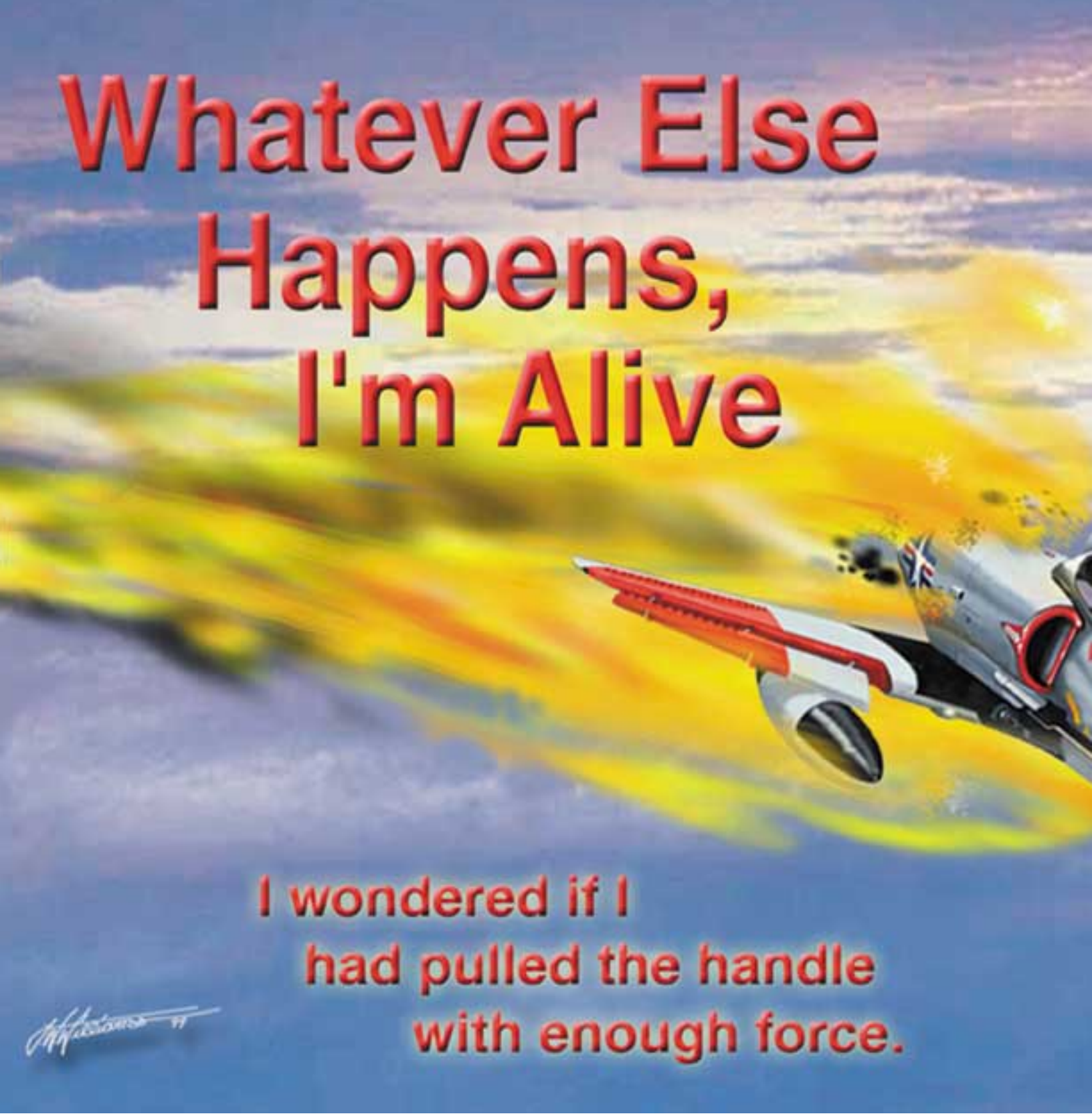
I quickly lowered the nose cone and got an earful from the director. He had been as startled that the nose cone had come up as I had been surprised to see a COD suddenly right behind me. I quickly apologized, as did he once he realized there had been no contact. After a rash of recent crunches on the flight deck, the threat had been issued that the next person responsible for a crunch would get to visit the old man. Neither of us wanted that dubious honor.

During flight ops, the unforgiving environment forces you to keep your head on a swivel and aware of your surroundings. Knowing you're in a dangerous environment keeps you on your toes. However, approaching midnight with nasty weather, I had made the mistake of thinking I was alone on the flight deck and could do my preflight on my terms. The yellowshirts had not made the same blunder; they kept me from being the subject of a mess-deck discussion the next day. I had learned a valuable lesson without causing any damage except to my pride.

LCdr. Thomas flies with VAW-117.

Photo by Lt. Ed Martin

Whatever Else Happens, I'm Alive



We carried then-Marine-Capt. Peters' account of his ejection–actually, the events that led up to the ejection–in the July '90 issue. "Third Time's a Charm" described the engine failure his TA-4J suffered during an ACM hop. Loss of oil feed to the No. 5 engine bearing caused an explosion that cut the Skyhawk in half, leaving Capt. Peters and his student facing an immediate bailout. This follow-up story describes what happened after he pulled the handle.

As air-to-air syllabus flight instructors, we had briefed emergency ejection procedures ad

nauseam, and they were second nature. Perhaps that was the point. We also had a tendency to casually refer to ejecting as "stepping over the side," or "giving the aircraft back to the taxpayers." After trying to eject twice, my third attempt was finally successful.

The time expansion phenomenon was amazing; seconds became minutes. At first, I wondered if I had pulled the handle with enough force. Nothing was happening. We were tumbling out of control in flames, and I reassured myself that I might be the first aviator to survive a manual bailout from an A-4.

I was forcing myself to maintain the proper seat posture with my chin slightly elevated, but I really wanted to look around to assess the situation. Nothing. We were still in flames, falling. Still nothing.

After what seemed an eternity, the cockpit seemed to slowly fill up with ice water. The feeling startled me as I tried to make out what could be happening—ice-cold air was flooding the cockpit from the bottom up. The canopy had separated from the aircraft. About time. That was supposed to happen a half-second after I pulled the handle. Good thing I hadn't gone for the manual-release lever.

Any day now the seat would fire. I might have been in denial before, but after feeling the control stick completely dead, I had no reason to hang around. It was only supposed to be another half-second interval, but again, nothing.

I reviewed manual-bailout procedures again. If I reached for the handle and the seat fired, I might break my arm. How long to wait? Couldn't see for some reason. I wished I could see the altimeter. How far had I fallen? How long before I hit the ground? I started out at 15,000 feet before the zoom... It felt like I had been hit in the rear by a 500-pound gorilla with a baseball bat. Around 40 G's to the spine, metered over a half-second. No pain, but that couldn't have been good. I didn't know it at the time, but my tailbone had broken. Now I was being compressed into the seat like a rag doll, all the air in my lungs was forced out in a huge sigh, and my chin was pinned to my chest. I had to breathe, but I couldn't move out of this position.

Seat-man separation could happen any time now, as far as I was concerned. Another of those half-second intervals in the manufacturer's warranty, no doubt. I really wanted out of this seat. It had only been about seven seconds from the explosion to this point,

but already it had been a long day. All I wanted now was a good chute and a ride back to base.

Separating from the seat turned out to be the most violent phase. The sensation started with my being ripped from the seat and went downhill from there. Suddenly, I wanted my seat back. It was like rotating and tumbling about multiple axes at high speed. I was worried that when my chute opened, I'd be thoroughly entangled in the risers.

I pictured myself ripping through the air like an oblong block of twine. I still couldn't see for some reason, and I had no idea how close I was to the ground. I was ready for this to be over.

Sometime during this or the previous half-second interval, I suffered what NAMI refers to as routine flailing injuries that resulted from too much stress on the shoulder joints. Two arthroscopic surgeries were required to correct the side effects.

All motion suddenly stopped. I was floating as if I was weightless. For the first time, my vision returned, beginning with the blue sky, then the horizon line, then the brown earth below the line. I was upright and hanging suspended. I must be in my chute. Looking up was hard with the helmet sandwiched between the main risers, but they could be pulled apart. At least my arms still worked. The chute was incredibly small and pretty pathetic looking—a bunch of olive-green, dingy white, and orange panels sewn together in no apparent order or pattern. It didn't look very military, but it was round and full. All I had now was a casual float to the ground, a ride home, and a couple of days off, no doubt. Wait, there wasn't an opening shock. What about my torso harness? What about my ... a quick inventory, and I was convinced I would still have children someday. I had no idea how far it was to the ground. I couldn't make out much fine detail, so it must have still been a fair distance. Time was finally back in perspective once again.

There was a flash of motion out of nowhere as my wingman circled close enough for me to make out the astonished look on his face. I stuck out my thumb to let him know I'm alright and to hitch a ride. Apparently, he was amazed to see me alive, thinking that the seats had cooked off in the flames and fired ballistically. But that was all behind us now, and the SAR helo must be on its way. A strip of dark haze trailed off to a site about five miles away and the smoking hole that was once my aircraft. Then, out of nowhere, debris started fluttering around me like a mysterious collection of garbage.

And then there was the snap-on mask bag I never used. Where did that come from? FOD left in the cockpit on turnarounds. It hit me for the first time since pulling the handle that I wasn't alone in the aircraft, and my student might be out here somewhere, but I couldn't find him. The only space that I couldn't visually clear was my immediate six o'clock, but I popped my head back through the main risers again, and there he was, hanging limp and unconscious in his chute, oscillating with his legs just feet away from my riser lines. If he entangled my chute, we'd both probably go down hard; one good canopy couldn't possibly support two of us.

As he swayed toward my risers, I pulled away as hard as I could. It worked, but it also rotated me away from my student. I let up on the pull and rotated back so I could see him as he headed toward me again. Back and forth we went. It was still a long way down, and this was going to get very tedious. Then I remembered the four-line release and pulled the loops. I gained a little separation, but not enough for comfort. It went like that all the way down. Sometimes, I could get a feeling for how much longer it was going to be until I landed by how the horizon changed from less blue above the line to more dingy brown below it.

At last, it was time to think about hitting the ground. I saw a cattle fence, a dirt road next to it, and what appeared to be a ranch house about a quarter of a mile down the road. Great, at least there would be a telephone.

I finally had to ignore my student and focus on the landing. The ground was now rushing up toward me. I wondered why we spend two million dollars to train a pilot, only to

skimp on his survival chute. This might hurt. I could use the four-line release to steer a final approach path, lining up on the dirt road next to the fence. It was a wire fence, not barbed wire. At least I had that going for me.

On the other side of the road, opposite the fence, a dense row of bushes came into focus as three-foot-high prickly-pear cactus. Oh, great. I was lined up perfectly now, and actually arrogant enough to think I'd make a walking recovery down the road.

At about 20 feet to go, ground effect took over, my downward momentum slowed, and the surface crosswind moved me laterally. I lost my lineup on the road and couldn't recover it. I assumed the position and plunged into the cactus hedgerow, bouncing from one clump to the next. One, two, three bounces.

Then, at long last, it was over. I stood up without being able to feel the cactus needles covering my left side and screamed something unprintable. The gentle crosswind began inflating my chute again, and I was about to be dragged face-first through more cactus. Those riser releases popped off faster than they ever had during indoc. I looked up in time to see my student just before he hit the ground, but he was still oscillating severely. He was on a full upward swing when he ran out of altitude, slamming into the ground. That hurt. I needed to get to him, but he was on the other side of the fence.

Somehow, I managed to tear something in my leg and walking was hard. I tried pulling the cattle fence up from the bottom, but it was well-mounted, so I had to go over the top. The fence was more than six feet high and wouldn't bend. I could make it up one side, but because of my leg, I couldn't make it over the top. The only option was to lean forward to fall over and try to grab the fence on the way down to break my fall. But I hit the ground on the other side and just lay there.

My student was about 20 feet away, lying on his side facing me, just watching. Neither one of us had any immediate inclination to move, so we just stared at each other for a few moments. Then we both burst out laughing.

After resting for a few moments, I dragged myself over to him and asked how he was doing. His leg was broken, and both of us were in shock. Off in the distance, we could hear the faint sound of rotor blades inbound. The "Fat Lady" was clearing her throat. Life was good.

On the way home, I thought about all the Hollywood interpretations I had seen of the event that I had just survived. Rambos parachuting down, guns blazing, without so much as a smudge on their boot polish as they single-handedly took on an enemy regiment.

I was just happy to be alive.

LCdr. Peters left the Marine Corps via an inter-service transfer. His last assignment was with VR-58, flying C-9s.

Continued from page 5

experiments with aerial radios required establishing a laboratory at Pensacola.

For the Navy, the seminal period of carrier operations began soon after WWI with the commissioning of the USS *Langley* (CV-1), the converted collier *Jupiter*, as the first American aircraft carrier. Short, stubby, and not at all attractive, the *Langley* nonetheless gained a place in the hearts of its crew and the young aviators who made their first traps and launches from its tiny flight deck. The first of these early tailhookers was LCdr. V.C. Griffin, who made the first launch from the Navy's new carrier on October 17, 1922. LCdr. Godfrey DeC. Chevalier was the first aviator to trap aboard the ship on October 26, 1922.

Developments continued, including the rise of the landing signal officer, that quintessential living landing aid, and the sorting out of how best to recover landing aircraft using a series of cables strung across the deck-at first at both the aft and forward end of the ship.

Initial devices included an early "tail hook" mounted on the spreader bars between the main landing gear's V-struts. They worked, but sometimes the aircraft tipped over, bending the propeller.

Lt. (later Admiral) Mel Pride devised a hook mounted below the tail and a reduced number of cables held above the deck by bridges.

Naval aviation developments continued throughout the mid-war decades. Sea-based aviation played a close second role to land-based aircraft, especially in performance. Acceptance of naval aviation was always a problem for the admirals and tacticians, who constantly fought a deep-seated bias against carriers. The Army and the Navy were constantly at each other's throats. Although naval aircraft gradually approached the speeds and power of their land-based counterparts, the force was always in search of missions.

Well, any landing you can walk away from… In mid-1942 this F4F snagged the cable OK aboard USS *Ranger*, but the stress was too much for the rear fuselage.

The hardware of the time was in its infancy: launching and recovery gear, radio and radar that helped naval aircrews find their way back to their ship, or which helped target incoming enemy formations. By 1940, launching and retrieving aircraft had become almost commonplace. Hydraulic catapults gave a hard, but dependable kick in the tail, and the 12 to 14 cables strung at either end of the flight deck assured a landing for all but the most ham-fisted pilots.

By the time the U.S. entered World War II, the American fleet was a major presence in the Atlantic and the Pacific. Unfortunately, American naval aircraft were well behind their counterparts in Europe and Japan. Although well-made, such types as the Brewster F2A, the Douglas TBD Devastator torpedo bomber, and the Vought SB2U Vindicator dive bomber were an unsatisfactory mix of old and new technology, employing metal and canvas, and rather low-powered engines. In the case of the tubby F2A, a less-than-robust landing gear was a constant problem aboard ship.

Crew coordination in the multi-place types did not have the emphasis we assume today. Gunners were isolated in turrets or far behind the pilot, linked only by intercom. If a third man was required as a bombardier, he was buried within the fuselage or sandwiched between the pilot and gunner.

The war brought changes in existing systems and types of aircraft. Two main areas did not exist in an operational sense at the beginning of the war but had evolved by the last year of the conflict: jet aircraft and ejection seats. The two seemed made for each other.

Turbine-powered aircraft had first flown just before the start of the war in 1939 in Germany, and soon thereaf-

ter, in England. America and Italy followed by 1942, and by 1945, the Japanese had flown their own jets. But it was in Germany and England that early jet development evolved into truly operational aircraft, the Messerschmitt Me. 262 and the Gloster Meteor, respectively.

Emergency egress was still accomplished by the traditional over-the-side parachute jump, but the jet's higher speeds, as well as new technology pioneered in Germany for its night-fighter corps, saw the initial use of rudimentary rocket-powered seats. Pilots still had to manually separate from their seat and deploy the chute.

Steady research in Great Britain and the U.S. immediately after the war mated the jet-powered fighter with the ejection seat. The first naval jet equipped with the seat was the McDonnell FH-1 Phantom. The first actual use of a seat occurred on August 9, 1949, when Lt. Jack L. Fruin ejected from his F2H-1 Banshee during a cross-country. The first combat use of the ejection seat came on September 24, 1950, when Lt. Carl Dace of VF-111 vacated his F9F-3 Panther after being hit by flak on a strafing run.

LCdr. Bill Amen, CO of VF-111, beams after making the Navy's first jet kill, a MiG-15 in November 1950. He had to borrow an F9F from sister squadron VF-112.

The seats of the time were not the completely integrated escape systems we take for granted today. The main purpose of the seat was to simply get the aviator out of his aircraft. It was up to him to judge his altitude and release his parachute. Survival after splashing down also depended on the aviator's alertness and skill. No Sewars, no zero-zero seats or barostatically controlled chutes. Indeed, most carrier aviators through the early 1960s flew with their canopies rolled back until they were safely climbing away from the flight deck, the better to get out of their aircraft at low altitude or in case they ditched.

From our standpoint at the Naval Safety Center, we actually came in fairly late in the game. Sure, people thought about how not to get killed or crash from the most early stages of flight, yet an organized safety program is relatively new. The mishap numbers before the introduction of NATOPS in 1961 were through the roof. Planes crashed, crews died, millions of dollars were lost even before squadrons got into combat.

With the establishment of a safety center and various safety programs, like NATOPS and the NAMPS, there came a realization that periodic craziness would not be business as usual. After a general reassessment of how we did that business every day, the stats declined.

New aircraft, systems and training requirements also contributed to the dramatic lowering of mishap figures.

(Part II will appear in the January issue.)

Always a handful to bring aboard, the Cutlass contributed to the extremely high mishap rate of the 1950s. This F7U's ramp strike on the *Hancock* had the LSO dashing for cover. The pilot survived.

Our Nearly Backward Rendezvous

by Lt. Jonathan R. Williams

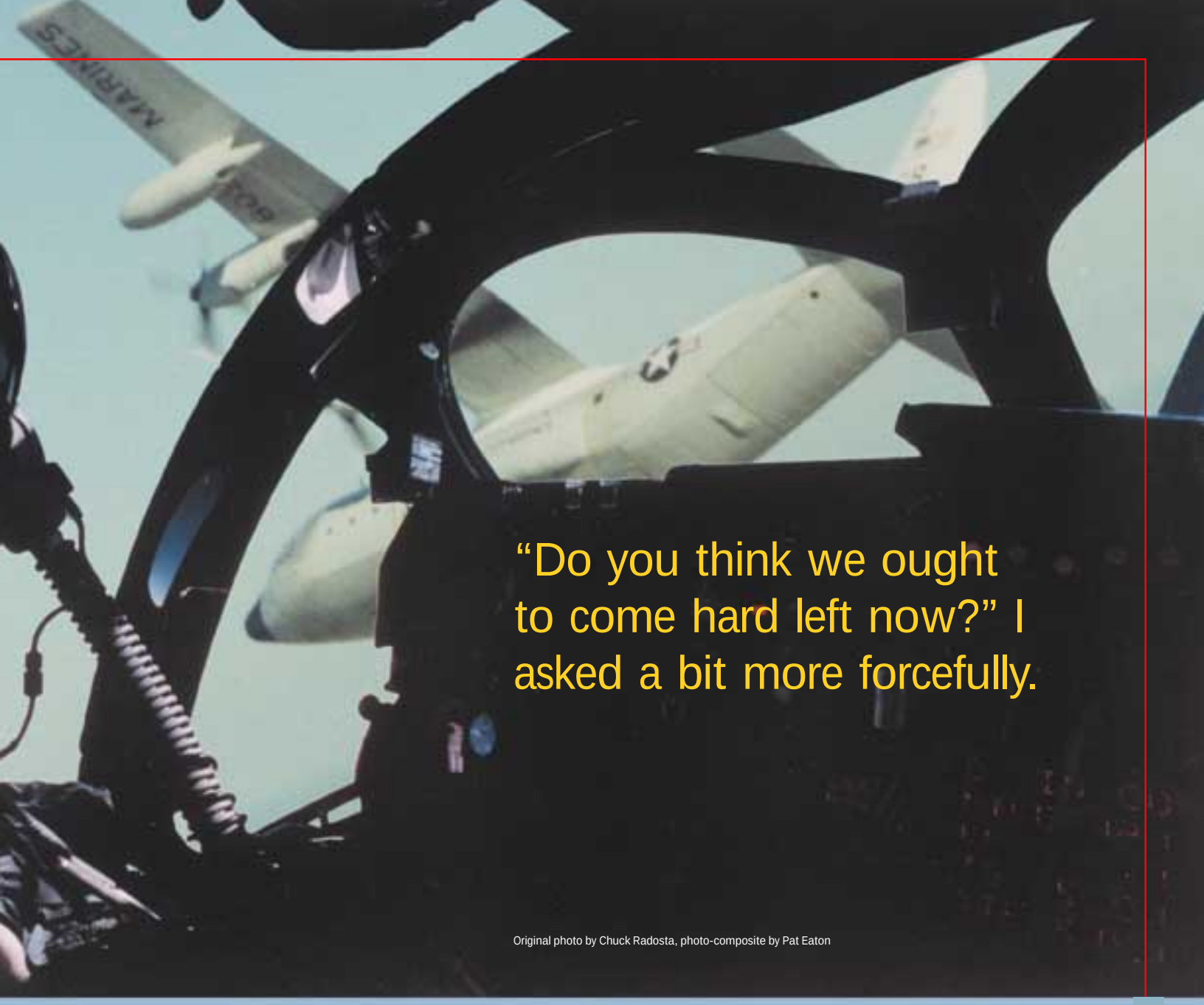
Aircrew coordination breaks down on every flight. These lapses are usually minor, and no harm comes to the aircraft or crew. The following story is one that could have easily ended in a spectacular fireball and a mishap report that garnered national attention. Instead, a few aviators have a story to tell in ready rooms for the rest of their careers. As you read, you will see that each of the crew coordination elements failed at one point or another during this flight.

The mission was a large, coordinated-strike exercise in the Nellis Air Force Base ranges. My squadron was one of two EA-6B squadrons in Las Vegas on a good-deal detachment to provide SEAD for weapons-school training flights. The deal couldn't have been better—good tactical flying and students doing all the flight planning.

We were one of three Prowlers to launch out of Nellis providing SEAD support to myriad strike assets, including AV-8Bs, F-15s and FA-18s. Our sister squadron launched two aircraft as a section, and we flew as a single.

As a cruise-experienced ECMO, I had already operated in this type of dynamic environment, but I had never flown out of Nellis. I was more concerned about course rules and area management than tactics. To complicate matters, we were fragged to rendezvous on and take gas from a Marine KC-130 tanker immediately after takeoff. I had spent plenty of time behind KC-135s and KC-10s, but the KC-130 would be entirely new to me. My pilot, on the other hand, had done an instructor tour with the Marines, and he was an old hand on the KC-130.

An experienced pilot, he briefed me on the non-standard left-hand turns, outside join-up, since the KC-130 flies too slow for jets to join on the inside of the track. Made sense to me. We would also crack the flaps and slats once joined up because the slow airspeed would limit our maneuverability. With his assurance that he had the complete SA to hold my hand through this new experience, we manned up and launched.



"Do you think we ought to come hard left now?" I asked a bit more forcefully.

Original photo by Chuck Radosta, photo-composite by Pat Eaton

Our departure was uneventful despite my lack of familiarity with local procedures. Cleaned up and heading north, we switched up tactical frequencies and headed for the tanker track, my head down in the radar boot trying to find the gaggle of aircraft. The other two Prowlers and eight Harriers were also scheduled for give on the same tanker. We were last to launch, so I expected a fairly large radar target. With no difficulty, we spotted the tanker 10 miles in front of us, slightly left of the nose, halfway through a left turn at the northern point of its track. As expected, the 10 chicks on the tanker made it easy to get a visual at that range.

Although it was an unusual join-up, my cruise-experienced brain distinctly told me we needed to bring the jet left to try setting up for an outside rendezvous. The tanker was nearing the end of its turn now and was coming back into us at a steadily decreasing range. I envisioned a left turn, followed by a hard right 180 once the tanker began to pass down our right side. Our aircraft, however, continued straight ahead in a gradual descent toward the tanker's altitude. I was looking out the pilot's windscreen watching as a very obvious collision course developed. We were still about 5 miles away, so although I was

puzzled, I was not yet terribly concerned.

"What's your plan on the join-up?" I asked my pilot, hoping to prompt him to take some action, or at least communicate his plan to the crew. No response. We continued straight ahead, still in a gradual descent.

"Do you think we ought to come hard left now?" I asked a bit more forcefully. Nothing. He must know what he's doing, I figured. He must have seen this situation a hundred times. Who am I to jump in and tell him how to rendezvous? After all, ECMO etiquette dictates extreme tact when dealing with a pilot's ego. If the roles were reversed, I wouldn't want him explaining to me how to operate the navigation system.

My sense of self-preservation began to speak more loudly to me. My brain was seeing an impending collision, and I simply could not understand what my pilot was trying to do. We needed to come hard left, and now!

"We need to come hard left," I said as forcefully as I could in a normal voice. Our jet, however, started a very slight right-wing dip. Now I was mad. "He's blowing me off," I thought angrily. "Fine, I'll just let him screw this up and be embarrassed about it later." In my mind, my pilot didn't trust the opinion of his less-experienced crewmate, so I was as defensive as I could be.

My pouting didn't last very long, since I still saw the KC-130 getting larger and larger in our windscreen. We were close enough now to make out all the chicks on the tanker. Our gradual descent continued, and given no action on our pilot's part, we would hit the tanker as we crossed its flight path at a 45-degree angle. We were too close to make any kind of loaded maneuver in the Sky Pig.

"Push, push, push!" I yelled now at the top of my lungs. Thankfully, my pilot reacted instinctively and actually did exactly what I said. Pushing the stick to the instrument panel, he sent all of us toward the canopy, making the view of the tanker and chicks even better as we watched the entire formation pass over us at no more than 100 feet. To make matters worse, the Harriers were flying a very disciplined formation. So we had two of the Harriers pass us at less than 50 feet! Several of the other aircraft on the tanker took evasive action to avoid us as we blundered through the pattern.

There was stunned silence in our cockpit for a while. I really didn't know what to say to my pilot, but I had figured out he really didn't know what he had been doing. We weren't in the mood to discuss the situation at the time, and my pilot brought the aircraft hard left, moved to the outside of the tanker and joined. The rest of the flight proceeded normally from there, albeit with little extraneous discussion in our cockpit. We returned to the field for the inevitable fur ball in the Nellis pattern, shut down and proceeded to our debrief.

I was still so mad that I took one of our backseaters aside to ask him what he perceived had happened on that flight. I felt the pilot had simply ignored me, a serious ACT breakdown. Luckily, my crewmate was able to calm me down enough to realize that my perception might not be reality. With this option in my mind, we headed to our crew debrief to get our story straight before the event debrief.

As it turned out, the skipper of the Harrier squadron didn't want to wait for the event debrief to express his displeasure with our flying skills. I walked into the ready room to find our pilot getting read the riot act.

In our debrief, my newly humbled pilot willingly confessed what had happened. He simply did not see the tanker as I saw it. The entire time I was seeing a tanker coming left and into us, he was seeing a tanker turning right and away from us!

From the moment we saw the tanker at 10 miles, his brain interpreted the sight picture backwards from what it was, and this evaluation was hard for him to let go of, given the low speed that the KC-130 flies, which is not

as hard to do as one might think. As the tanker got closer, he simply locked up as his eyes tried to tell his brain something different than what his brain was expecting to see.

We trundled along toward our intercept as his helmet fire continued to burn. He wasn't necessarily blowing me off; he was just thoroughly confused and not sure what action to take. The only thing that broke his stupor was my frantic call to "Push," which he followed.

The crew coordination breakdowns in our cockpit had been numerous. For starters, rank and experience differences in the cockpit made me reluctant to speak up forcefully when I should have. Secondly, my reaction to being "blown off" was to pout, rather than to be sure of myself and give directions to the pilot. Perhaps I could have convinced him earlier to prevent the near miss. My pilot also confessed that his experience level made him overconfident, and he tended to take my recommendations as less than gospel.

The vast majority of aircraft mishaps result from aircrew error. Most of those errors could be corrected without incident if our crew coordination skills did not also tend to break down at exactly the moment we most need them. This is the ultimate irony: A crew can have the best crew coordination skills during uneventful flights, but the time that a crewmember is least likely to listen to his crewmates is when he is fixated on incorrect information or unaware of critical elements that are about to ruin his day. At these moments crew coordination simply has to work.

Lt. Williams flies with VX-9 as an EA-6B Operational Test Director.

On Cat 1

Coming Attractions for January

- Looking Backward, Looking Forward, Part II
- A Tale of An ORM Convert
- Don't Rush Me!

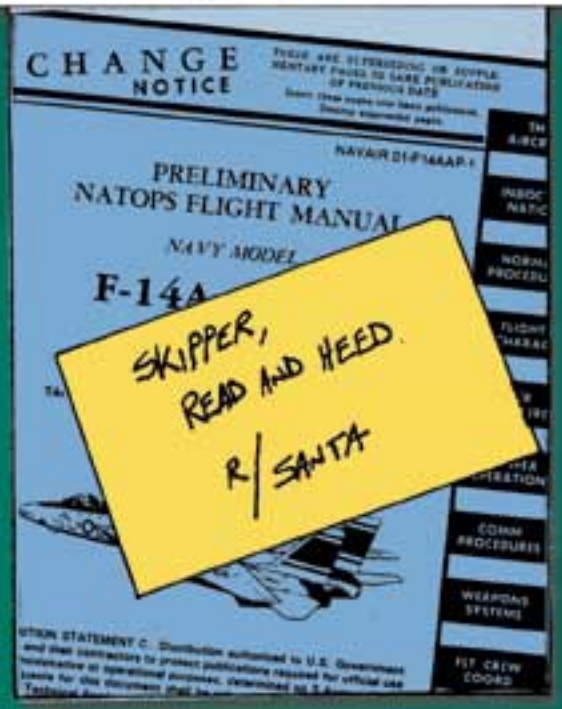
BROWNSHOES IN ACTION COMIX

A Brownshoes Christmas

With a twinkle in his eye and a bright, red coat, Dangerboy Kringle Arcs 'round the boat.

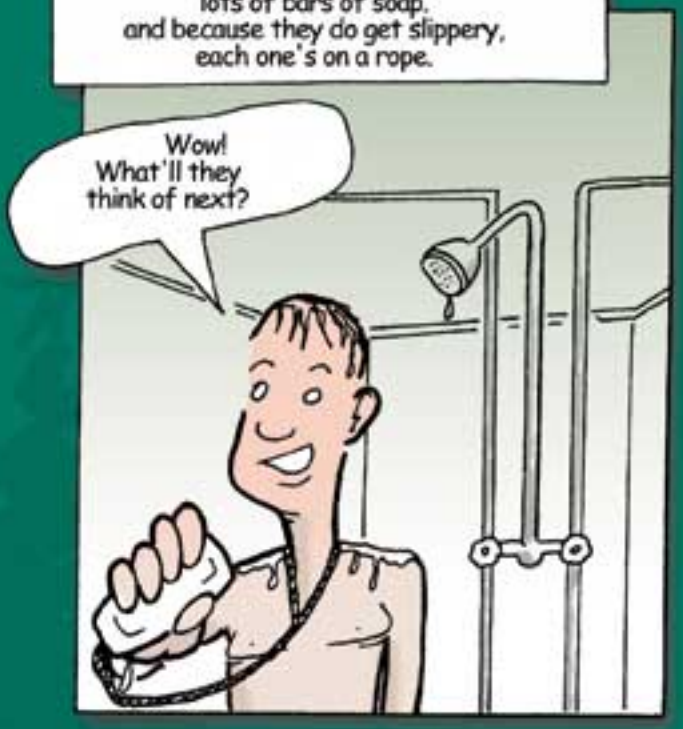
Rapping on the bulkhead, prancing on the tile, he's got a bag of goodies to make his shipmates smile.

A NATOPS for the skipper, with plastic cover of blue and because he's very busy, the latest changes are put in, too.



Drysuits for the aircrew For when the weathers's cold They're fun to wear, not to mention, a fashion statement bold.

For sometimes pungent roommates, lots of bars of soap, and because they do get slippery, each one's on a rope.



So brief the flight and fly the brief, and keep a centered ball. Happy holidays to the fleet, and peace on earth to all.